

PSYC 411

Design and Analysis in Psychological Research

Winter 2020

Instructor:	Dr. Mark Holden	Lecture Location:	Online
Phone:	403-210-9552	Lecture Days/Time:	Online
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Course Description

This course builds on the foundation of Psyc 300/301 (Research Methods and Data Analysis in Psychology I and II) OR Psyc 312 (Experimental Design and Quantitative Research Methods in Psychology) by introducing students to numerous statistical methods and experimental design considerations that are frequently encountered in Psychological Research. The aim of this course is to provide students with an overview of different design considerations or methods that they are likely to encounter, whether through their own research or when evaluating research by other psychologists. These skills are useful for psychology majors, those considering graduate studies in psychology, or even those who simply wish to be better consumers of research.

Note: This course focuses on quantitative approaches. Students interested in qualitative psychological research should consider Psyc 415 - Qualitative Inquiry in Psychology.

Because this course seeks to introduce students to various statistical procedures, there is a laboratory component in which students will gain direct experience with these methods. This experiential learning (learning by doing) component of the course will therefore be integrated with the lecture material, as a way of reinforcing the concepts discussed in class.

Course Format

As you all know, the university has moved to online courses for the remainder of the semester. But, the online delivery of this course will be remarkably similar to the in-person delivery of this course. I have taught numerous online classes before, and each of them has been just as successful as their in-person equivalents. So, as before with the in-person lectures, the online delivery of this course will make use of a variety of techniques, including lectures, demonstrations, discussions, readings, practice problems, and (maybe) the occasional guest speaker. As with the in person delivery of this course, you will notice that there are a number of activities in which I expect students to be **active participants** in the learning process. Research shows that this type of participation improves learning and retention of material, and – anecdotally – it makes classes a lot more fun, too! Please note that, unlike in an in-person lecture setting, I will not be able to monitor this participation (at least during the lecture component). It is therefore up to the students to make use of these learning opportunities (and not merely fast-forward through them). ***I strongly advise students to still engage in these activities, to try the practice problems***

from the lectures, and so on - as these activities are meant to make the material come to life, improve student engagement, and aid in retention of the material.

Course Learning Outcomes

The Department of Psychology is committed to student knowledge and skill development. The table below lists the key learning outcomes for this course, the program-learning outcomes they facilitate (see psyc.ucalgary.ca/undergraduate/program-learning-outcomes), and the expected level of achievement.

Course Learning Outcomes	Assessment Methods	PLO(s)	Level(s)
Interpret and evaluate psychological research – including interpreting graphical depictions of data, critically assessing statistical methods, and drawing appropriate conclusions.	Exams, Lab assignments	2, 3, 4, 5, 7	A
Identify and apply the appropriate quantitative analysis techniques required to address questions in psychological research or to help inform or generate solutions to personal, social, and/or societal problems.	Exams, Lab assignments	2, 3, 4, 7	A
Input, organize, and manipulate data, and conduct statistical analyses using statistical software (or by hand)	Exams, Lab assignments	3	A
Describe the advantages, limitations, and assumptions of different research and/or statistical methods and apply these methods to real-world problems (e.g. scenarios given in lab assignments).	Exams, Lab assignments	2, 3, 4, 7	A
Communicate psychological research findings effectively, to both scientific and non-scientific audiences, including the appropriate and effective use of figures, graphs, and tables (and APA style)	Exams, Lab assignments	3, 4, 5	A

Notes. PLOs = Program-Learning Outcomes: 1 = demonstrate knowledge of psychological sciences, 2 = think critically and solve problems, 3 = conduct research and analyze data, 4 = communicate effectively, 5 = demonstrate information literacy, 6 = understand and implement ethical principles, 7 = apply psychological knowledge and skills. Level of PLO achievement facilitated by this course: I = introductory, C = competency, A = advanced.

Prerequisites

Psyc 312 (A and B) – Experimental Design and Quantitative Research Methods in Psychology

OR Psyc 300 and 301 – Research Methods and Data Analysis in Psychology I and II

AND admission to either the Psychology major or Honors Program

Required Text

Field, A. (2017). *Discovering statistics using IBM SPSS statistics* (5th North American ed.). London: Sage Publications Ltd.

The textbook is available in the bookstore, and a copy should be available on Reserve in the Taylor Family Digital Library. Alternatively, students may be able to find a copy of the previous (4th) edition, or an e-book online.

Course Expectations

Although the course is now to be delivered online, I still have some (modified) expectations for both the students as well as for myself, below. In general, these all boil down to one simple rule, though: **I expect**

us all to be respectful of one another, and for each of us to do our part in making this a safe, comfortable learning environment for everyone. We are facing a unique situation, but by working together we can make this class something that we can all be proud of! Most of all, I will insist upon maintaining the same kind of civil atmosphere – in which members of the class treat each other with mutual respect – that we had in our in-person format. It is through this kind of learning environment what we can focus our attention and energy on teaching and learning, rather than on frustration, conflict, and distrust. ***Please note: it is sometimes easier to say mean-spirited things online than it is in person. Even though it is an online class, remember that the people that you are engaging with (e.g. in a group chat) are still the same people and classmates that we had in our lectures. As such, I will hold and strictly enforce all the same guidelines of mutual respect that we had for our in-person lectures.***

Expectations of Students

- **To be prepared, and attentive during class**
 - As I mentioned in the mass email to students yesterday, ***lectures will now be delivered in an asynchronous online format.*** This means that I will record lectures and post them online so that students can listen and go through the lectures according to their own schedules and lives. This is particularly important (to me) at a time when some students might need to be working, to take care of loved ones, or who simply feel a little overwhelmed. This will allow you to engage with the lectures when you wish. If I can make a suggestion, though, I would point out that it is sometimes easy to procrastinate and then need to learn all the material at the end of the year. This is a bad idea. ***Try to set a schedule where you will listen to lectures at the same time each week.*** For many, this might mean listening to lectures right at 11:00, MWF, as we did before. For others, it might be different. But please do yourself a favor and try to set and abide by a schedule.

- **To make every effort not to be a distraction to yourself or others**
 - In an in-person class, we often talk about distracting those around us, causing them to potentially miss some of the material. But, ***engaging in other activities during online learning – such as texting, checking email, checking social media – are incredibly tempting since you’re already online. However, these activities will negatively impact your learning, as they cause distractions and make you less efficient and effective in your learning*** (as we learned in Cognitive Psychology when we discussed “switch costs”). I would therefore strongly suggest that, when you go through online lectures, try to close all other tabs in your browser, turn off your phone, etc. That is, set aside the 50 minutes just for learning. Don’t allow for distractions to yourself!

- **To be willing to participate positively and constructively during class**
 - As outlined above, active participation is a critical component to my teaching style, and improves student learning and retention of material. There will still be activities in the online classes, and I hope that all students will still engage in these activities in an online learning platform. These activities increase engagement with the material, as well as retention of that material for exams.

- **To treat all other students in the class, as well as the instructor, with respect**
 - We are very lucky to have a diverse population of students at the U of C, who come from different backgrounds and bring different experiences with them. These

differences are a valuable means by which we will learn about individual and group differences. ***I will insist that all of us treat those students who are willing to share their thoughts and experiences with our full respect and attention. Avoid disrespectful comments, innuendos, and any and all other negative commentary.*** As I said above, this seems to be more of an issue in many online environments (see almost every chat room ever, for an example). However, I will stress that these are still the same people, students, and friends that were present in the in-person class. ***If something wasn't acceptable as a comment in an in-person class, it's not acceptable online. I will still enforce the same guidelines of mutual respect among all students that we had in our in-person classes.***

- **To understand and abide by the procedures and regulations outlined in the syllabus**

Expectations of the Instructor

- **To be just as prepared, and enthusiastic during lectures to facilitate student learning**
 - As I mentioned in the opening note on the syllabus, I love this course. I will always be prepared and happy to be teaching you.
- **To treat all students with dignity, respect, and fairness in order to provide a class structure that encourages learning**
 - Teachers who are disrespectful to students need to find another occupation. Seriously. A proper learning environment is one in which students feel safe to share their thoughts, experiences, or questions. Therefore, I have always treated my students with dignity, respect, and fairness. I do not play favorites, and I *never* belittle my students. I know that it is a bit daunting to raise your hand (or comment online) to share your personal experiences in class. As such, I hold *all* my students in high esteem, regardless of how well they perform in my classes, and I try my best to communicate this to them through both my words and my actions.
- **To grade objectively, consistently, and to return grades in a timely manner**
 - Again, I do not play favorites. In an attempt to keep marking from being subjective, all written materials are marked using a rubric (grading scheme) which is applied fairly and consistently to all students. The grading time may vary with time of year and the type of assignment. However, you will always have your assignment grades returned in as timely a manner as possible.
- **To be genuinely concerned about and interested in student learning and performance, and to be sensitive to student needs or concerns**
 - I always want my students to succeed. I do not provide “easy bonus marks” but I will readily try to help any student with *any* aspect of the course that they are struggling to understand. If special circumstances arise that might adversely affect your course performance, please let me know as soon as possible. I can't help if I don't know about it.
- **To understand and abide by the procedures and regulations outlined in the syllabus**

Asking Questions

Asking questions is an extremely important part of learning. I strongly encourage you to ask a question whenever you require clarification on an issue, or have an observation to make yourself. Given the new format for the class, you have a couple of different options. The first is to ask questions directly to me via email. I am more than happy to answer questions this way. Alternatively, you can post questions or comments on the discussion board that will be added to our D2L website. I will generally answer email questions within 1 business day (though it might be 2 days during particularly busy times), and discussion boards will be checked every 3 days.

Note: Routine questions such as “When and where is the exam?” or “What chapters are covered for the midterm?” (and so on) may already be addressed on the course website and are listed in the tentative Lecture Schedule.

Assessment Methods

Midterm Exam 1 (25%)

Covers all class material from Jan 13 – Feb 11

30 points, multiple choice and short answer questions

February 13th, 2020

Midterm Exam 2 (25%)

Covers all class material from Feb 26 – Mar 20

30 points, multiple choice and short answer questions

March 24th, 8:00 AM

Final Exam (30%)

Covers all class material, with emphasis on material after Mar 20

40 points, multiple choice and short answer questions

April 18th, 8:30 AM

Laboratory Assignments (20%)

Several lab assignments will be due during the course of the semester.

For more information on the topics, due dates, and more, please see below

Students must achieve a passing grade in both the class and lab components to pass this course.

Extra Information about Exams:

Exams will be delivered online, using D2L under Assessments > Quizzes.

The use of computers, iPads, phones, graphing calculators, or any other programmable technology is NOT permitted during the exams.

Study aids (e.g. books or notes), contact with other students, etc... are also NOT permitted during exams.

Exams will be “live” from 8:00 AM on the date of the exam until the end of the exam (e.g. until 8:50 AM for the midterm for those without accommodations). The time limit will be strictly enforced.

Students will be required to electronically sign a confidentiality agreement before taking the exam (it basically shows up like question 1)

Extra Information about Lab Assignments:

Lab assignments will now be handed in online to the relevant D2L dropbox. They are due at 9:00 a.m. on the date shown on the course schedule (below)

Without approved documentation, late lab assignments will receive a penalty of 20% per day late (including weekend days), up to a maximum of 4 days late. After this time, the assignment will receive a grade of 0.

There are 8 lab assignments over the course of the semester. When calculating your final grade, of which assignments are worth 20%, **the 8 assignments will count equally toward the 20% component (i.e. 2.5% per lab).**

Lab Topics:

Note: Dates for labs, and due dates for the lab assignments may be found below, included in the Lecture Schedule.

Lab 1: Refresher on SPSS, Critical Thinking, Defining Variables

Lab 2: Experimental and Non-Experimental Research Methods

Lab 3: T-tests, Effect Sizes, and Power Analysis

Lab 4: Oneway and Factorial ANOVA

Lab 5: Post-hoc Contrasts in Oneway and Factorial Designs

Lab 6: Planned and Complex Contrasts in Oneway and Factorial Designs

Lab 7: Within-Subjects ANOVA (and contrasts)

Lab 8: Correlations and (Semi-)Partial Correlations

Department of Psychology Criteria for Letter Grades

Psychology professors use the following criteria when assigning letter grades:

A+ grade: *Exceptional Performance.* An A+ grade indicates near perfect performance on multiple choice and short answer exams. For research papers/essays/course projects/presentations, an A+ grade is awarded for exceptional work deserving of special recognition and is therefore not a common grade.

A, A- Range: *Excellent Performance.* Superior understanding of course material. Written work is very strong in terms of critical and original thinking, content, organization, and the expression of ideas, and demonstrates student's thorough knowledge of subject matter.

B Range: *Good Performance.* Above average understanding of course material. Written work shows evidence of critical thinking and attention to organization and editing but could be improved in form and/or content.

C Range: *Satisfactory Performance.* Adequate understanding of course material. Knowledge of basic concepts and terminology is demonstrated. Written work is satisfactory and meets essential requirements but could be improved significantly in form and content. Note: All prerequisites for courses offered by the Faculty of Arts must be met with a minimum grade of C-.

D range: *Marginally meets standards.* Minimal understanding of subject matter. Written work is marginally acceptable and meets basic requirements but requires substantial improvements in form and

content. Student has not mastered course material at a level sufficient for advancement into more senior courses in the same or related subjects.

F grade: *Course standards not met.* Inadequate understanding of subject matter. Written work does not meet basic requirements. Student has not demonstrated knowledge of course material at a level sufficient for course credit.

Grading Scale

A+	96-100%	B+	80-84%	C+	67-71%	D+	54-58%
A	90-95%	B	76-79%	C	63-66%	D	50-53%
A-	85-89%	B-	72-75%	C-	59-62%	F	0-49%

As stated in the University Calendar, it is at the instructor’s discretion to round off either upward or downward to determine a final grade when the average of term work and final examinations is between two letter grades.

In this course there will be no rounding up of final grades, especially in light of the opportunities students have to increase their final grade via research participation.

Tentative Lecture Schedule

Date	Topic	Lab Topic	Assignment
T Jan 14	<i>Winter Lectures Begin</i> Introduction & Welcome to P411		
R Jan 16	<i>Last day to drop Winter Term half-courses.</i> Review: Critical Thinking, Defining and Measuring Variables		
T Jan 21	Review: Measuring Variables, Correlation	Lab 1: Refresher on SPSS, Critical Thinking, and Defining Variables	
R Jan 23	Review: Correlation, Experimental Methods		
F Jan 24	<i>Last day to add or swap Winter Term half courses.</i>		
T Jan 28	Reliability & Validity, T-tests, Cohen’s d	Lab 2: Non-experimental Research Methods	Lab Assignment 1 due (day of lab)
R Jan 30	T-test & Cohen’s d Hypothesis Testing <ul style="list-style-type: none"> ▪ Type I and Type II Error rates ▪ Power Analysis 		
F Jan 31	<i>Tuition Fee Deadline</i>		
T Feb 4	Hypothesis Testing, Replication Crisis: <ul style="list-style-type: none"> ▪ Problems with NHST ▪ P-hacking ▪ HARKing ▪ Solutions 	Lab 3: T-tests, Effect Sizes, Power Analysis	Lab Assignment 2 due (day of lab)
R Feb 6			
T Feb 11	Between-Subjects One-Way ANOVA	<i>No Lab (Exam 1)</i>	
R Feb 13	Midterm Exam 1 (25%)	Topics 1-3	

Feb 16-22	Reading Week. No lectures. University open (except Family Day).	No Labs	
M Feb 17	Alberta Family Day, University closed (except Taylor Family Digital Library, Law, Medical, Gallagher and Business Libraries). No lectures.	(Reading Week)	
T Feb 25	Between-Subjects One-way & Factorial ANOVA		
R Feb 27	Between-Subjects Factorial ANOVA	Lab 4: One-way and Factorial ANOVA	Lab Assignment 3 due (day of lab)
T Mar 3	Exam Review		
R Mar 5	Planned & Post-Hoc Contrasts (Between-Subj) <ul style="list-style-type: none"> ▪ Orthogonality ▪ Built-in Contrasts (SPSS) ▪ Polynomial Contrasts ▪ Custom Contrasts ▪ Effect Sizes of Contrasts 	Lab 5: Post-hoc Contrasts in One-way and Factorial ANOVA	Lab Assignment 4 due (day of lab)
T Mar 10			
R Mar 12	Contrasts for Factorial Designs		
T Mar 17		Friday & Monday labs rescheduled	Lab Assignment 5 due 3/17 at 9AM (hand in online)
R Mar 19	Within-Subjects ANOVA		
T Mar 24	Midterm Exam 2 (25%)	Topic 4-5	
R Mar 26	Within-Subjects ANOVA (cont'd)	3/25: Lab 6: Planned Contrasts in One-way and Factorial ANOVA	
T Mar 31	Correlations <ul style="list-style-type: none"> ▪ Pearson ▪ Biserial & Point Biserial ▪ Partial & Semi-Partial 		
R Apr 2		4/1: Lab 7: Within-Subjects ANOVA (and contrasts)	Lab Assignment 6 due 4/1 at 9AM (hand in online)
T Apr 7	Regression <ul style="list-style-type: none"> ▪ Simple Regression ▪ Multiple Regression 		
R Apr 9		4/8 Lab 8: Correlations and (Semi-)Partial Correlations	Lab Assignment 7 due 4/8 at 9AM (hand in online)
F Apr 10	Good Friday. No Classes.	No Labs (Good Friday)	
M Apr 13	Non-Instructional Day; No Class; University Open	No Labs (Easter Monday)	
T Apr 14	Regression Cont'd		

W Apr 15	Winter Term Lectures End. Last day to withdraw from full courses and Winter Term half courses.		Lab Assignment 8 due 4/15 at 9AM (hand in online)
Apr 18-29		<i>Winter Term Final Examination Period</i>	

Plagiarism and Other Academic Misconduct

Intellectual honesty is the cornerstone of the development and acquisition of knowledge and requires that the contribution of others be acknowledged. Consequently, plagiarism or cheating on any assignment is regarded as an extremely serious academic offense. Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not. Students should examine sections of the University Calendar that present a Statement of Intellectual honesty and definitions and penalties associated with Plagiarism/Cheating/Other Academic Misconduct.

Academic Accommodations

The student accommodation policy can be found at: ucalgary.ca/access/accommodations/policy. Students needing an Accommodation because of a Disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities ucalgary.ca/policies/files/policies/student-accommodation-policy. Students needing an Accommodation based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to the instructor.

Seating During Exams

I suggest a comfortable chair.

Absence From A Test/Exam

Makeup tests/exams are **NOT** an option without the approval of the instructor. A student may be asked to provide supporting documentation for an exemption/special request for a make-up exam <https://www.ucalgary.ca/pubs/calendar/current/n-1.html>. Students who miss a test/exam have up to 48 hours to contact the instructor to ask for a makeup test/exam. It's the instructor's discretion if they will allow a make-up exam. Students who do not schedule a makeup test/exam with the instructor within this 48-hour period forfeit the right to a makeup test/exam. At the instructor's discretion, a makeup test/exam may differ significantly (in form and/or content) from a regularly scheduled test/exam. **Once approved by the instructor a makeup test/exam must be written within 2 weeks of the missed test/exam during exam make-up hours provided by the department** <http://psychology.ucalgary.ca/undergraduate/exam-and-course-information#mues>. **If a student cannot write their final exam on the date assigned by the Registrar's Office, they need to apply for a deferred exam** <https://www.ucalgary.ca/registrar/exams/deferred-exams>.

Travel During Exams

Consistent with University regulations, students are expected to be available to write scheduled exams at any time during the official December and April examination periods. Requests to write a make-up exam because of conflicting travel plans (e.g., flight bookings) will NOT be considered by the department. Students are advised to wait until the final examination schedule is posted before making any travel arrangements. **If a student cannot write their final exam on the date assigned by the Registrar's Office, they need to apply for a deferred exam** <https://www.ucalgary.ca/registrar/exams/deferred-exams>. **Students with an exceptional extenuating circumstance (e.g., a family emergency) should contact the Department of Psychology (psyugrd@ucalgary.ca).**

Reappraisal of Graded Term Work <http://www.ucalgary.ca/pubs/calendar/current/i-2.html>

Reappraisal of Final Grade <http://www.ucalgary.ca/pubs/calendar/current/i-3.html>

Academic Accommodations

Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services; SAS will process the request and issue letters of accommodation to instructors. For additional information on support services and accommodations for students with disabilities, visit www.ucalgary.ca/access/. Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their Instructor. The full policy on Student Accommodations is available at <http://www.ucalgary.ca/policies/files/policies/student-accommodation-policy.pdf>.

Academic Misconduct

For information on academic misconduct and its consequences, please see the University of Calgary Calendar at <http://www.ucalgary.ca/pubs/calendar/current/k.html>

Instructor Intellectual Property

Course materials created by professor(s) (including course outlines, presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the professor(s). These materials may NOT be reproduced, redistributed or copied without the explicit consent of the professor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

Copyright Legislation

All students are required to read the University of Calgary policy on Acceptable Use of Material Protected by Copyright (www.ucalgary.ca/policies/files/policies/acceptable-use-of-material-protected-by-copyright.pdf) and requirements of the copyright act (<https://laws-lois.justice.gc.ca/eng/acts/C-42/index.html>) to ensure they are aware of the consequences of unauthorized sharing of course materials (including instructor notes, electronic versions of textbooks etc.). Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy.

Freedom OF Information and Protection of Privacy

Student information will be collected in accordance with typical (or usual) classroom practice. Students' assignments will be accessible only by the authorized course faculty. Private information related to the individual student is treated with the utmost regard by the faculty at the University of Calgary

Student Support and Resources

<https://www.ucalgary.ca/registrar/registration/course-outlines>

Acknowledgments and Respect for Diversity

Our classrooms view diversity of identity as a strength and resource. Your experiences and different perspectives are encouraged and add to a rich learning environment that fosters critical thought through respectful discussion and inclusion. The Department of Psychology would also like to acknowledge the traditional territories of the people of the Treaty 7 region in southern Alberta. The City of Calgary is also home to Métis Nation of Alberta, Region III.

Student Organizations

Psychology students may wish to join the Psychology Undergraduate Students' Association (PSYCHS). They are located in Administration 130 and may be contacted at 403-220-5567.

Student Union VP Academic: Phone: 403-220-3911 suvpaca@ucalgary.ca

Student Union Faculty Rep.: arts1@su.ucalgary.ca

Important Dates

The last day to drop this course with no "W" notation and **still receive a tuition fee refund** is **January 23, 2020**. Last day for registration/change of registration is **January 24, 2020**. The last day to withdraw from this course is **April 15, 2020**.